

What is claimed is:

1. A method for producing fibers ranging in diameter from micrometer-sized to nanometer-sized, comprising the steps of:
  - a. producing an electric field;
  - b. preparing a solid precipitative reaction media wherein said media comprises at least one chemical reactive precursor and a solvent having low electrical conductivity and wherein a solid precipitation reaction process for nucleation and growth of a solid phase occurs within said media;
  - c. subjecting said media to said electric field to induce in-situ growth of fibers ranging in diameter from micrometer-sized to nanometer-sized during said reaction process within said media causing precipitative growth of solid phase particles wherein the reaction conditions and reaction kinetics control the size, morphology and composition of said fibers.
2. The method of Claim 1 further comprising the step of adding premade seeding particles to said media in step c) to enhance the kinetics and mass of the fiber production process whereby said premade seeding particles are linearly connected due to said electric field aligning said seeding particles and wherein said seeding particles are coated and connected to one another by said reactive precursor in said solid precipitative reaction media, wherein said media comprises fibers grown from said precipitative reaction process of step c) and fibers formed from adding said seeding particles to said media.
3. The method of Claim 1 wherein said solid precipitative reaction media is a sol-gel reactive media.
4. The method of Claim 3 wherein said chemical reactive precursor is silica.
5. The method of Claim 3 wherein said sol-gel reactive media comprises tetraethylorthosilicate (TEOS) in ethanol wherein said precipitation reaction process conditions comprise 0.17 to 0.5 M TEOS, 0.5-14 M water and 0.5-3 M ammonia (NH<sub>3</sub>).
6. The method of Claim 1 wherein said solvent is ethanol or *tert*-amyl alcohol.
7. A method for fabricating a monolithic material having uniform aligned fibrils ranging in diameter from micrometer-sized to nanometer-sized, comprising the steps of Claim 1 and further comprising the steps of:
  - d. wet pressing said fibers in said media into a solid monolith slab under said electric field wherein said fibers are separated from said solvent and formed into said solid monolith slab;

- e. drying said solid monolith slab; and
  - f. consolidating at least one solid monolith slab by firing said slab at a temperature ranging from about 500°C to about 1500°C, wherein said monolith slab is a monolithic material comprising uniform fibrils aligned in one direction.
8. An inorganic fibrous structure ranging in diameter from micrometer-sized to nanometer-sized, said fibrous structure having increased surface area and enhanced anisotropic properties including conductivity, permittivity, optical attenuation and mechanical toughening, and said inorganic fibrous structure having a length-to-diameter aspect ratio of greater than 100:1.
9. A solid monolithic material comprising aligned uniform fibrils ranging in diameter from micrometer-sized to nanometer-sized having enhanced anisotropic properties including conductivity, permittivity, optical attenuation, mechanical toughening and permeation, said monolithic material further having tailored capillary-like channels ranging in diameter from micrometer-sized to nanometer-sized thereby increasing the volumetric capacity of said monolithic material and said monolithic material having a surface chemistry capable of being tailored for various organic ligand grafting.
10. The solid monolithic material of Claim 9 wherein said surface chemistry is tailored thereto functionalize said solid monolithic material.
11. An electrophoretic media comprising the solid monolithic material of Claim 9, wherein said monolithic material has properties of a separation matrix in the direction of said aligned fibrils and further having anisotropic properties in regards to retention, interaction and separation of biomolecules.
12. The electrophoretic media of Claim 11 wherein the surface of said solid monolithic material is functionalized.
13. A catalyst comprising the solid monolithic material of Claim 9.
14. The catalyst of Claim 13 wherein the surface of said solid monolithic material is functionalized.
15. An ion exchange resin comprising the solid monolithic material of Claim 9.

16. The ion exchange resin of Claim 15 wherein the surface of said solid monolithic material is functionalized.
17. An electronic device comprising the solid monolithic material of Claim 9.
18. The electronic device of Claim 17 wherein the surface of said solid monolithic material is functionalized.